Dissertation Defense
Health Information Exchange Network Under Collaboration, Cooperation, and Competition

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3:15 pm – 5:00 pm EDT, Monday May 3, 2021

Abstract

Health Information Exchange (HIE) network allows securely accessing and sharing healthcare-related information among healthcare providers (HCPs) and payers. HIE services are provided by either a non-profit or profit organizations under several subscription plans options. A few studies have addressed the sustainability of the HIE network such that HIE providers, HCPs, and payers remain profitable in the long term. However, none of these studies addressed the coexistence of multiple HIE providers in the network. Such coexistence may have a huge impact on the behavior of healthcare systems in terms of adoption rate and HIE pricing strategies. In addition, in spite of all the effort to maintain cooperation between HIE providers, there is still a chance of competition among them in the market. Possible competition among service providers leads to many concerns about the HIE network sustainability and behavior. In this study, a game-theoretic approach to model the HIE market is proposed. Game-theory is used to simulate the behavior of the three different HIE network agents in HIE market: HIE providers, HCPs, and payers. Pricing strategies and adoption decisions are optimized using a Linear Programming (LP) mathematical model. Then compared to a heuristic approach using agent-based modeling (ABM) simulation. Results show that the relation between HIEs in the market is crucial to HCP/Payer adoption decision. A small change in the discount rate proposed by a competitive HIE provider will highly affect the decision of HCP/Payers to join the HIE network. Finally, in order for HIE provider to maintain sustainability, non-pricing strategies such as after sale service are recommended to avoid price war and to guarantee positive profit.